# THE JOURNAL

OF

# BIOLOGICAL CHEMISTRY

FOUNDED BY CHRISTIAN A. HERTER AND SUBTAINED IN PART BY THE CHRISTIAN A. HERTER MEMORIAL FUND

EDITED FOR THE AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS

EDITORIAL BOARD

RUDOLPH J. ANDERSON
W. MANSFIELD CLARK
HANS T. CLARKE
CARL F. CORI
EDWARD A. DOISY
A. BAIRD HASTINGS
HOWARD B. LEWIS
ELMER V. McCOLLUM
WILLIAM C. ROSE
WILLIAM C. STADIE
DONALD D. VAN SLYKE
HUBERT B. VICKERY

VOLUME 142
BALTIMORE
1942

COPYRIGHT, 1942
BY
THE JOURNAL OF BIOLOGICAL CHEMISTRY

PUBLISHED AT YALE UNIVERSITY FOR
THE JOURNAL OF BIOLOGICAL CHEMISTRY, INC.
WAVERLY PRESS, INC.
BALTIMORE, U. S. A.

Medical Lib.
Cop. 1

# CONTENTS OF VOLUME 142

## No. 1, January, 1942

PAGE

Howe, Paul E. Edward Browning Meigs ..... 1

Hess, W. C., and Sullivan, M. X. Cystinuria. The effect of various amino acids on the excretion of cystine ..... 3

Winter, Irwin C. Fat metabolism after liver injury. Fatty acid utilization by rats treated with carbon tetrachloride on diets which were fat-free or contained fats with high or low iodine numbers ..... 17

O'Kane, D. J., and Umbreit, W. W. Transformations of phosphorus during glucose fermentation by living cells of *Streptococcus faecalis* ..... 25

Wood, H. G., Werkman, C. H., Hemingway, Allan, and Nier, A. O. Fixation of carbon dioxide by pigeon liver in the dissimilation of pyruvic acid ..... 31

Swendseid, Marian E., Barnes, Richard H., Hemingway, Allan, and Nier, A. O. The formation of acetone bodies from acetic acid ..... 47

Shaw, J. C. A comparison of the acetone body metabolism of the lactating mammary gland of the normal cow with that of the cow with ketosis ..... 53

Reed, Gerald. The polarographic estimation of cystine in urine ..... 61

Jacobi, H. P., and Baumann, C. A. The biochemical defect in choline-deficient rats ..... 65

McKibbin, J. M., Schaefer, A. E., Frost, D. V., and Elvehjem, C. A. Studies on anemia in dogs due to pyridoxine deficiency ..... 77

Axelrod, A. E., Potter, V. R., and Elvehjem, C. A. The succinoxidase system in riboflavin-deficient rats ..... 85

Schultze, M. O. The isolation of protoporphyrin IX from feces of normal and anemic rats ..... 89

Schultze, M. O., and Simmons, S. J. The use of radioactive copper in studies on nutritional anemia of rats ..... 97

Fraenkel-Conrat, Heinz, Simpson, Miriam E., and Evans, Herbert M. The effect of thiol compounds on the activity of lactogenic hormone ..... 107

Fraenkel-Conrat, Heinz. The effect of thiols on the reducing groups of lactogenic hormone ..... 119

Entenman, C., and Chaikoff, I. L. The response of lipid metabolism to alterations in nutritional state. II. The effects of overnutrition on the postabsorptive levels of the blood lipids of the dog ..... 129

NICOLET, BEN H., and SHINN, LEO A. Does hydroxyglutamic acid occur in milk proteins? ... 139
FLOX, JACK, PITESKY, ISADORE, and ALVING, ALF S. A direct photoelectric colorimetric method for the determination of diodrast and iodides in blood and urine ... 147
SENDROY, JULIUS, JR., and ALVING, ALF S. Photoelectric microdetermination of iodate and iodine ... 159
SENDROY, JULIUS, JR. Note on the photoelectric microdetermination of chloride in biological fluids ... 171
GREENSTEIN, JESSE P., and JENRETTE, WENDELL V. The reactivity of porphyrindin in the presence of denatured proteins ... 175
KETY, SEYMOUR S. The lead citrate complex ion and its rôle in the physiology and therapy of lead poisoning ... 181
SHARP, D. G., TAYLOR, A. R., BEARD, DOROTHY, and BEARD, J. W. Electrophoresis of the rabbit papilloma virus protein ... 193
SHARP, D. G., COOPER, GERALD R., and NEURATH, HANS. The electrophoretic properties of serum proteins. I. Normal horse pseudoglobulin GI ... 203
SHARP, D. G., HEBB, M. H., TAYLOR, A. R., and BEARD, J. W. Progressive boundary spread in electrophoresis of proteins in solution ... 217
KOENIG, RUTH ADELE, and JOHNSON, C. R. Spectrophotometric determination of iron. I. Use of mercaptoacetic acid ... 233
HARPER, HAROLD A. Carbohydrate metabolism in thiamine deficiency ... 239
NEURATH, HANS, COOPER, GERALD R., and ERICKSON, JOHN O. The denaturation of proteins and its apparent reversal. I. Horse serum albumin ... 249
NEURATH, HANS, COOPER, GERALD R., and ERICKSON, JOHN O. The denaturation of proteins and its apparent reversal. II. Horse serum pseudoglobulin ... 265
BEACH, ELIOT F., and TEAGUE, D. MAXWELL. A gravimetric method for the determination of methionine ... 277
WOOLLEY, D. W., and LONGSWORTH, L. G. Isolation of an antibiotin factor from egg white ... 285
ELLIS, SYDNEY, and WALKER, BURNHAM S. The action of hippuricase on ring-substituted derivatives of hippuric acid ... 291
BROWN, W. L. The threonine, serine, cystine, and methionine content of peanut proteins ... 299
ABRAMS, RICHARD, ALTSCHUL, A. M., and HOGNESS, T. R. Cytochrome *c* peroxidase. II. The peroxidase-hydrogen peroxide complex ... 303
BIRD, O. D., VANDENBELT, J. M., and EMMETT, A. D. Adaptation of the Scudi colorimetric method for pyridoxine ... 317
SCUDI, JOHN V., BUHS, RUDOLF P., and HOOD, DOROTHY B. The metabolism of vitamin $B_6$ ... 323
STODDARD, M. PALMER, and DUNN, MAX S. Quantitative investi-

gations of amino acids and peptides. VIII. The solubility and specific rotations of $l(-)$-leucine at twenty-five degrees..... 329
SCHNEIDER, A. K., and SPIELMAN, M. A. The synthesis of some methylated fatty acids..... 345
GREEN, D. E., and STUMPF, P. K. Starch phosphorylase of potato.... 355
LUNDGREN, HAROLD P., GURIN, SAMUEL, BACHMAN, CARL, and WILSON, D. WRIGHT. The gonadotropic hormone of urine of pregnancy. IV..... 367
VENNESLAND, BIRGIT, SOLOMON, A. K., BUCHANAN, JOHN M., CRAMER, RICHARD D., and HASTINGS, A. BAIRD. Metabolism of lactic acid containing radioactive carbon in the $\alpha$ or $\beta$ position..... 371
VENNESLAND, BIRGIT, SOLOMON, A. K., BUCHANAN, JOHN M., and HASTINGS, A. BAIRD. Glycogen formation from glucose in the presence of radioactive carbon dioxide..... 379
SMYTHE, C. V. The utilization of cysteine and cystine by rat liver with the production of hydrogen sulfide..... 387
HUFF, JESSE W., and PERLZWEIG, WILLIAM A. Studies in nicotinic acid metabolism. III. Metabolism and synthesis of nicotinic acid in the rat..... 401
POTTER, V. R., and DUBOIS, K. P. The quantitative determination of cytochrome *c*..... 417
SCHOLANDER, P. F. Method for the determination of the gas content of tissue..... 427
SCHOLANDER, P. F., IRVING, LAURENCE, and GRINNELL, S. W. Aerobic and anaerobic changes in seal muscles during diving..... 431
OVERMAN, ANDREA. Influence of some dietary factors on the development of rancidity in the fat of the white rat..... 441

*Letters to the Editors*

WRIGHT, LEMUEL D. The effect of glucose administration on the level of blood pantothenic acid..... 445
GREEN, ARDA ALDEN, CORI, GERTY T., and CORI, CARL F. Crystalline muscle phosphorylase..... 447
CARTER, HERBERT E., GLICK, FRANCIS J., NORRIS, WILLIAM P., and PHILLIPS, GEORGE E. The structure of sphingosine..... 449

No. 2, FEBRUARY, 1942

WINNICK, THEODORE. Microdiffusion methods based on the bisulfite reaction. II. Determination of lactic acid by oxidation with ceric sulfate..... 451
WINNICK, THEODORE. Microdiffusion methods based on the bisulfite reaction. III. Determination of threonine by oxidation with periodate..... 461
EICHELBERGER, LILLIAN, and MCLEAN, FRANKLIN C. The distribution of calcium and magnesium between the cells and the extracellular fluids of skeletal muscle and liver in dogs..... 467

TOMPKINS, EDWARD R., and KIRK, PAUL L. Quantitative drop analysis. XVI. An improved diffusion method for total nitrogen. 477
REINECKE, ROGER M. The application of the skatole color reaction to the determination of fructose in blood. 487
CHARGAFF, ERWIN. A study of lipoproteins. 491
CHARGAFF, ERWIN. The formation of the phosphorus compounds in egg yolk. 505
PERLMANN, GERTRUDE E., and FERRY, RONALD M. A note on the separation of kidney phosphatases. 513
WAKSMAN, SELMAN A., and TISHLER, MAX. The chemical nature of actinomycin, an antimicrobial substance produced by *Actinomyces antibioticus*. 519
SMYTHE, C. V., and KING, C. G. A study of ascorbic acid synthesis by animal tissues *in vitro*. 529
POTTER, V. R., and SCHNEIDER, W. C. Studies on the mechanism of hydrogen transport in animal tissues. V. Dilution effects in the succinoxidase system. 543
JONES, JAMES H. The relation of the pH of intestinal contents to calcium and phosphorus utilization. 557
STARK, IRENE E. Equilibria in diastatic reactions. 569
STARK, IRENE E., and SOMOGYI, MICHAEL. Note on the fermentation of maltose and glucose in alkaline solutions. 579
LITTLE, JOHN E., and CALDWELL, M. L. A study of the action of pancreatic amylase. 585
BAUMANN, C. A., FOSTER, E. G., and MOORE, P. R. The effect of dibenzanthracene, of alcohol, and of other agents on vitamin A in the rat. 597
NICOLET, BEN H., SHINN, LEO A., and SAIDEL, LEO J. The lability toward alkali of serine and threonine in proteins, and some of its consequences. 609
MELVILLE, DONALD B., HOFMANN, KLAUS, HAGUE, ELEANOR, and DU VIGNEAUD, VINCENT. The isolation of biotin from milk. 615
BOYD, ELDON M., and CLARKE, ELEANOR L. The fractionation of cattle blood iodine with alcohol. 619
SILBER, ROBERT H., and UNNA, KLAUS. Studies on the urinary excretion of pantothenic acid. 623
STETTEN, DEWITT, JR. Biological synthesis of choline by rats on diets with and without adequate lipotropic methyl. 629
FRIEDEMANN, THEODORE E. Ketosis in Primates. II. The ratio of $\beta$-hydroxybutyric acid to acetoacetic acid in the blood and urine. 635
PEARLMAN, W. H., PINCUS, GREGORY, and WERTHESSEN, NICHOLAS T. The isolation of allopregnanol-3($\beta$)-one-20 from human pregnancy urine. 649
TREADWELL, C. R., GROOTHUIS, MARJORIE, and ECKSTEIN, H. C. The influence of supplementary casein, cystine, and methionine on liver lipid content. 653

SINCLAIR, R. G., and DOLAN, MARGERY. The so called ether-insoluble phospholipids in blood and tissues ..... 659
MOWRY, DAVID T., BRODE, WALLACE R., and BROWN, J. B. Studies on the chemistry of the fatty acids. IX. A spectroscopic study of methyl arachidonate purified by crystallization and distillation and its alkali isomerization product ..... 671
MOWRY, DAVID T., BRODE, WALLACE R., and BROWN, J. B. Studies on the chemistry of the fatty acids. X. The structure of arachidonic acid as evidenced by oxidative degradation and selective hydrogenation ..... 679
BORCHERS, RAYMOND, and BERG, CLARENCE P. The effect of conditions of hydrolysis and of prolonged heating upon the optical rotation of sulfuric acid hydrolysates of zein ..... 693
BORCHERS, RAYMOND, TOTTER, JOHN R., and BERG, CLARENCE P. Threonine deficiency in hydrolysates of zein prepared by autoclaving ..... 697
WARNER, ROBERT C. The kinetics of the hydrolysis of urea and of arginine ..... 705
WARNER, ROBERT C., and CANNAN, R. KEITH. The formation of ammonia from proteins in alkaline solution ..... 725
WARNER, ROBERT C. The alkaline hydrolysis of egg albumin ..... 741
LONGWELL, BERNARD B., and MCKEE, FRANCES S. The excretion of estrogens in the bile and urine after the administration of estrone ..... 757
VAN SLYKE, DONALD D., and KREYSA, FRANK J. Microdetermination of calcium by precipitation as picrolonate and estimation of the precipitated carbon by manometric combustion ..... 765
STOCK, A. H. Studies on the hemolytic streptococcus. IV. Further purification and concentration of scarlet fever toxin ..... 777
KREJCI, L. E., STOCK, A. H., SANIGAR, E. B., and KRAEMER, E. O. Studies on the hemolytic streptococcus. V. The electrophoretic isolation of the erythrogenic toxin of scarlet fever and the determination of its chemical and physical properties ..... 785
CANNAN, R. KEITH, PALMER, ALBERT H., and KIBRICK, ANDRE C. The hydrogen ion dissociation curve of $\beta$-lactoglobulin ..... 803
ZITTLE, CHARLES A., and HARRIS, TZVEE N. The antigenic structure of hemolytic streptococci of Lancefield Group A. X. The purification and certain properties of the group-specific polysaccharide ..... 823
HAAS, ERWIN, HARRER, CARTER J., and HOGNESS, T. R. Microdetermination of triphosphopyridine nucleotide ..... 835
YOUNG, E. GORDON, and CONWAY, CATHERINE F. On the estimation of allantoin by the Rimini-Schryver reaction ..... 839
DRABKIN, DAVID L. Spectrophotometric studies. IX. The reaction of cyanide with nitrogenous derivatives of ferriprotoporphyrin ..... 855
COHEN, SEYMOUR S., and STANLEY, W. M. The action of intestinal nucleophosphatase on tobacco mosaic virus ..... 863

Tracy, Ann H., and Ross, William F. Carbon suboxide and proteins. V. Further study of the nature of the reaction ..... 871
Morris, Daniel Luzon. Lichenin and araban in oats (*Avena sativa*) . 881
McGee, Lemuel C., and Hastings, A. Baird. The carbon dioxide tension and acid-base balance of jejunal secretions in man ..... 893
Mann, Walter, Leblond, Charles P., and Warren, Stafford L. Iodine metabolism of the thyroid gland ..... 905
Shull, G. M., Hutchings, B. L., and Peterson, W. H. A microbiological assay for biotin ..... 913
Shinowara, George Y., Jones, Lois M., and Reinhart, Harry L. The estimation of serum inorganic phosphate and "acid" and "alkaline" phosphatase activity ..... 921
Jones, Lois M., and Shinowara, George Y. Serum inorganic phosphate and "alkaline" phosphatase activity in hypophysectomized rats ..... 935
Overman, Ralph S., Stahmann, Mark Arnold, Sullivan, William R., Huebner, Charles Ferdinand, Campbell, Harold A., and Link, Karl Paul. Studies on the hemorrhagic sweet clover disease. VII. The effect of 3,3′-methylenebis(4-hydroxycoumarin) on the prothrombin time of the plasma of various animals .. 941

*Letters to the Editors*

Clarke, Miriam F., Lechycka, Marie, and Light, Amos E. A supplementary growth factor for *Lactobacillus casei* ..... 957
Scott, D. A. Crystalline preparation of carbonic anhydrase ..... 959
Feeney, R. E., and Strong, F. M. The concentration of the substance in blood which is stimulatory for *Lactobacillus casei* ..... 961
Folch, Jordi, and Woolley, D. W. Inositol, a constituent of a brain phosphatide ..... 963

Index to Volume 142 ..... 965